

# **COMMUNICATION**

The logical assets that predispose the port of Cotonou to serve the international hinterland,

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# **3. HAGIA SOPHIA**

**INTERNATIONAL CONFERENCE  
ON MULTIDISCIPLINARY  
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## **FULL TEXTS BOOK**

Editors

Dr. Faruk DÜNDAR

Zhandos ALIMGEREY

# HAGIA SOPHIA

3.INTERNATIONAL CONFERENCE ON ON MULTIDISCIPLINARY SCIENTIFIC STUDIES

## AYASOFYA

3.Uluslararası Multidisipliner Bilimsel Arařtırmalar Kongresi



# Full Texts Book

**Editors**

**Dr. Faruk Dündar  
Zhandos Alimgerey**

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## HAGIA SOPHIA 3. INTERNATIONAL CONFERENCE ON MULTIDISCIPLINARY SCIENTIFIC STUDIES

### THE LOGISTICAL ASSETS THAT PREDISPOSE THE PORT OF COTONOU TO SERVE THE INTERNATIONAL HINTERLAND

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#### **Abstract**

Port and maritime activities are developing worldwide. Globalisation is making the logistics supply network more complex by emphasising the important role of distribution and transport in enhancing the market value of products. Efficient logistics activities are essential for the proper functioning of ports on the West African shore. As a hub of international trade for the WAEMU hinterland countries (Burkina-Faso, Mali, and Niger), the port of Cotonou, in a highly competitive international trade development environment, feels the need to make itself more competitive to acquire new market shares.

The objective of this research paper is to determine the logistical assets that predispose the port of Cotonou to serve the international hinterland.

For this paper, documentary research, direct observation and field surveys are the techniques used to collect the data. The questionnaire addressed to economic operators and concessionary port operators. Thus, two hundred and ninety-five (295) socio-professional actors of the port and maritime domain were surveyed.

The results obtained showed that the quality of services offered by the port of Cotonou is judged good by most of the economic actors questioned (consignees (83.4%) and shippers (80%)). However, a fair assessment was widely shared by freight forwarders (52%). The study reveals that all categories of freight forwarders operating on the Cotonou port platform surveyed consider that handling efficiency (80%) remains the indicator that determines the choice of the port of Cotonou. Similarly,

for the last five years, the quality of logistics services in the port of Cotonou has been judged as good by more than 50% of economic operators.

**Keywords:** Logistics, port of Cotonou, WAEMU, service, international hinterland

### **Introduction**

Trade has long been a driving force behind economic growth. With the advent of new production systems, the integration of global value chains and the tendency to rely on just-in-time logistics delivery systems means that, more than ever, trade must be faster and more reliable.

Ports need to increase the quantity of their flow and improve the logistical quality of the trade. They are seen as the driving force behind several development activities. Thus, ports in the West African Economic and Monetary Union (WAEMU) play a key role in international trade as the main gateway to international trade and the interface for different modes of transport to connect with the hinterland (CNUCED, 2003, p. 5).

In sub-Saharan Africa, port development is very often reduced to modernisation plans of the port tool, i.e., construction of modern quays, acquisition of modern handling equipment, deepening of the basin and widening of the quays, etc. However, the equipment and development of the port is not always easy. However, the equipment and improvement of the port logistics quality of the port of Cotonou are a necessary step to ensure the good service of its international hinterland.

For most of the Beninese people and the landlocked countries of the WAEMU (Burkina Faso, Mali, and Niger) and even Nigeria, the port of Cotonou is one of the main engines of socio-economic development. Indeed, the traffic of the port of Cotonou has experienced an exponential growth of its annual global metric tonnage of goods since the new port was commissioned in 1965. It gradually increased from 351,406 tonnes in the early 1965s to 1.5 million tonnes in 1979. This sustained growth has stabilised at around 10.5 million tonnes since 2014. To respond to this growth in Benin's maritime traffic, the port authorities have made massive investments and financial contributions to infrastructure and equipment through public-private partnerships with international firms to support various projects for the construction of handling terminals, multimodal transport or redevelopment.

The study focuses on determining the logistical assets that predispose the port of Cotonou to serve the international hinterland.

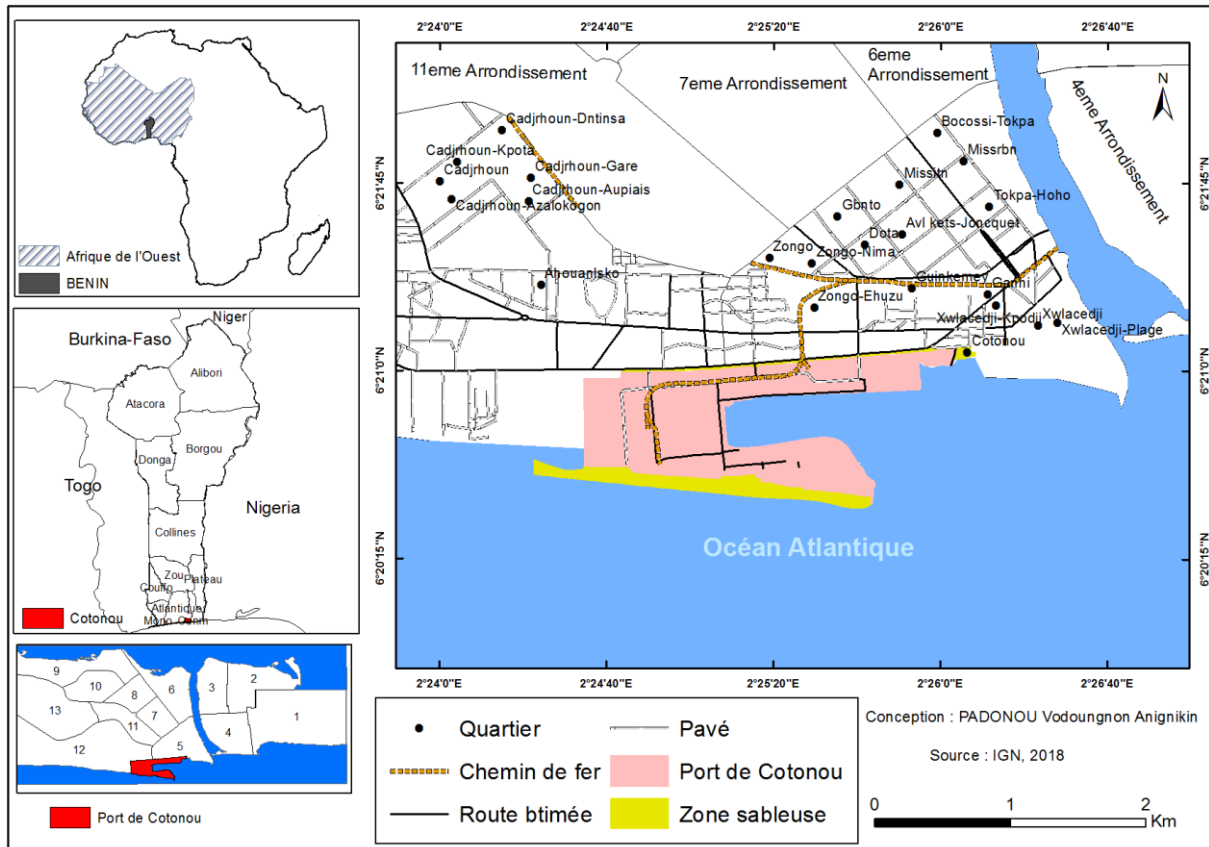
#### **1- Geographical position of the port of Cotonou**

The port of Cotonou currently covers a total area of 210 ha 64 a 09 ca. It has extra port areas. It is made up of a set of infrastructures / superstructures intended for the reception and treatment of ships on the one hand, and the loading, unloading and storage of goods on the other.

It is located at 6°20'15" and 6°21'45" North latitude, on the one hand, and between 2°24'0" and 2°26'40" East longitude, on the other hand (figure 1). The port of Cotonou is located on a low sandy coast on the southern edge of the city of Cotonou, the economic capital of Benin (PAC, 2008). The activities of this port and those linked to it, give life to the city, and make it the economic capital of Benin. As a port with a regional vocation and the Niger's oceanic gateway, it is the closest outlet to the sea, with the fastest and least uneven access corridor to serve the eastern landlocked countries, Mali, and Burkina Faso. In the sub-region, this port is approximately equidistant from the ports of

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Lagos (Nigeria), 115 km and Lome (Togo), 135 km. It is also the closest and fastest relay and transshipment port to Western Nigeria. It also serves Burkina Faso and Mali. It is sometimes the potential relief port for the port of Lagos. The port of Cotonou has a basic hinterland consisting of the entire Beninese national space and an international hinterland consisting of the Sahelian countries of the WAEMU (Burkina-Faso, Mali, and Niger).



**Figure 1:** Geographical location of the port of Cotonou

**Source:** IGN, 2018, Adapted by Vodoungnon Anignikin PADONOU

### 2- Data and methods

The methodological approach adopted is based on three main data collection techniques, namely documentary research, observation, and field surveys.

#### 2-1 Data collected in the framework of this study

The types of data collected include

- qualitative data collected from economic operators (Niger, Burkina Faso, Benin, and Mali) related to the organisation of economic exchanges
- quantitative data (volume of transported goods, storage areas, warehouses, transport costs, etc.) from institutions (PAC, CNCB, CBC, CNUT)
- port statistics (PAC, PAL, UNCTAD)
- data on the quality of infrastructure

## **2-2 Data collection techniques and tools**

### **- *Documentary review***

The review was based on the consultation of various books, publications and reports produced by structures and organisations. It was carried out at the documentation centre of Benin National Shippers' Council (CNCB), the port of Cotonou, and at the library of human sciences of the Université Libre de Bruxelles (ULB). Literature collected on the Internet from various sites (Scopus, sciencedirect, Cible+, DI-fusion and Proxy) formed an integral part of the search for information useful for the demonstration.

### **- *Fieldwork***

The fieldwork (actual observations and surveys) took place between June and November 2020, in the port of Cotonou and its suburbs, as well as in the dry ports.

#### *Observation*

This is an *in-situ* observation that refers to concrete situations, the objective being to capture the practices and behaviours of handlers, port users and transporters that the surveys themselves cannot capture. Indeed, the port of Cotonou is the epicentre of international commercial transactions in its immediate hinterland.

At the level of the port platform: In the port field, the spatial occupation through terminals, goods flows, equipment, and the logistic chain of the port of Cotonou, port infrastructures, activity zones and extension zones (dry ports, large car parks, etc.), port and maritime actors, the functioning and organisation of handling, transit and logistic operations on the bonded and non-bonded spaces were observed.

These observations made it possible to know and appreciate the chain of actors involved in port operations in the port of Cotonou as well as their activities, to appreciate the organisation and functioning of transport activities and the transport infrastructures and means.

In terms of the hinterland, the focus was on the Sahelian zones of origin of exported products and destination of goods imported by the port of Cotonou in order to identify the Sahelian countries of influence of the port and to determine the port category to which the port of Cotonou belongs.

We also took the opportunity to assess the extent of the modernisation work underway and to obtain additional information from port authorities and port and maritime operators. However, these observations allowed us to understand and evaluate the means and strategies put in place by the port of Cotonou to increase the growth of port activities and their influence on the hinterland by boosting traffic.

### **- *Sampling method***

The choice of the sample depends on the involvement of each actor in maritime and port activities, as well as maritime and land transport, and also in the process of routing goods and the nature of relations with the Sahelian countries in the hinterland of the port of Cotonou. The selection criterion is the number of years of activity, which is at least two years.

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Given the density of the actors involved and the extent of the study area, it was possible to define a certain number of parameters for the sample in a reasoned manner by the main groups that are the economic operators (importers, exporters, forwarders, transporters, etc.), the port administration, the concessionary port operators (APMT-Maersk, CMA-CGM and Bolloré Africa Logistics, etc.), the public operator managing the port of Cotonou.

Indeed, the determination of the sample size was possible thanks to the method of Schwartz (1995). His formula is as follows:

$$N = Z\alpha^2PQ / d^2$$

With the following parameters:

- N: sample size per user of the port.
- $Z\alpha^2$ : deviation fixed at 1.96 corresponding to a confidence level of 95%.
- P: number of respondents from the facility/total number of respondents from all the facilities chosen to conduct the research study.
- Q: 1-P.
- d: margin of error which is equal to 5%.

By proceeding in this way by category of actor, a sampling rate of 60% is applied to the result to determine the exact number of households to be surveyed. We developed a questionnaire addressed to 295 respondents distributed according to socio-professional groups (Table 1).

**Table 1:** Sample distribution of the surveyed population

Categories of officially selected actors	Number of respondents by category	P	Q	$Z\alpha^2$	$d^2$	N	Nx 60/100
Authorised freight forwarders	206	0.0188042	0.9811958	3.8416	0.0025	28	17
Itinerant freight forwarders	826	0.0753994	0.9246006	3.8416	0.0025	107	64
Authorised consignees	37	0.0033775	0.9966225	3.8416	0.0025	5	3
Shippers	900	0.0821543	0.9178457	3.8416	0.0025	116	70
Nigerian shippers	1938	0.1769055	0.8230945	3.8416	0.0025	224	134
<b>Total</b>	<b>3 907</b>		<b>Total</b>			<b>480</b>	<b>288</b>

**Source:** Fieldwork, September 2020

The analysis of Table I shows that the application of Schwartz's formula resulted in 288 actors to be interviewed. Given the relevance and importance of our research topic, the number of people to be interviewed was increased for some actors. Instead of three (03) authorised consignees to be interviewed, 10 actors in this field were taken. In sum, the total number of people chosen, all categories combined, is 295.

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All these actors in Table I were taken at random, considering their mobility, their availability, and their relationship with the Cotonou port platform.

### 2-3 Data processing and analysis

The survey forms were processed manually (coding of data) and automatically (integration of coded data into the computer using Access, SPSS 11.01, and the Excel spreadsheet). The map was produced using ArcView 3.2 software.

The results of the data analysis form part of the database to be used. Statistical data collected from the Port Authority (PAC), CNCB, CBC, CNUT and EMABE and in the field completed this database. The quantitative data were processed automatically, which made it possible to produce tables and graphs.

### 3- Results

#### 3.1 Legal and institutional framework for the development of maritime and port activities in the port of Cotonou

The port of Cotonou is a state-owned enterprise of the Beninese government, enjoying financial autonomy. Its main activity is maritime and port operations. These operations cover both the national and sub-regional territory (WAEMU and ECOWAS) and are driven by users from diverse backgrounds through the multicultural representation of the countries of the world.

However, the development of these activities considers not only national regulations but also those elaborated at international, sub-regional and then community level.

##### 3.1.1 Autonomous Port of Cotonou, a port under the aegis of the harmonised institutional framework of the WAEMU maritime sub-sector

The Republic of Benin is a country in French-speaking West Africa. Benin is a member state of the economic community of the West African Economic and Monetary Union (WAEMU), which came into being on 10 January 1994, and is made up of eight states (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo). All these member countries of this economic grouping are linked by the common use of the French language and the CFA franc, a gift from the French coloniser, an anti-development.

The mission of the WAEMU community economic grouping is to foster economic cooperation and integration by strengthening the competitiveness of activities within the community. To facilitate international trade by sea, a series of regulations have been adopted and signed by the WAEMU countries to define the rules that apply to maritime transport. Within this community, there are countries with a maritime frontage (Benin, Côte d'Ivoire, Guinea-Bissau, Senegal, and Togo) and also landlocked countries (Burkina-Faso, Mali and Niger) without a maritime frontage. This cooperation facilitates the access of each of these member countries to international trade.

In West Africa, commercial seaports are vectors for perfect sub-regional integration. In view of the significant traffic of goods transiting and processed daily by the ports, as well as their role as a propeller of the national economy of the coastal countries. However, the exercise of activities in the maritime and port sector within this community space is subject to debate and consensus through the laws and texts that govern it.

### 3.2 Maritime and port operations facilitated by modern logistics management tools

The port of Cotonou is a port platform in full mutation. It is the cornerstone of the economic development of the Beninese nation. On a regional level, it is one of the main logistics hubs for West Africa and the WAEMU community.

Indeed, the port of Cotonou benefits from a strong growth in goods traffic both for imports and for transit from or to the Sahel countries. It is also a redistribution platform par excellence.

Some key national and foreign maritime transport actors using the port of Cotonou gave their assessments of the quality of service offered by the port of Cotonou over the last five years. Figure 2 illustrates the opinions of shippers, consignees, and forwarders.

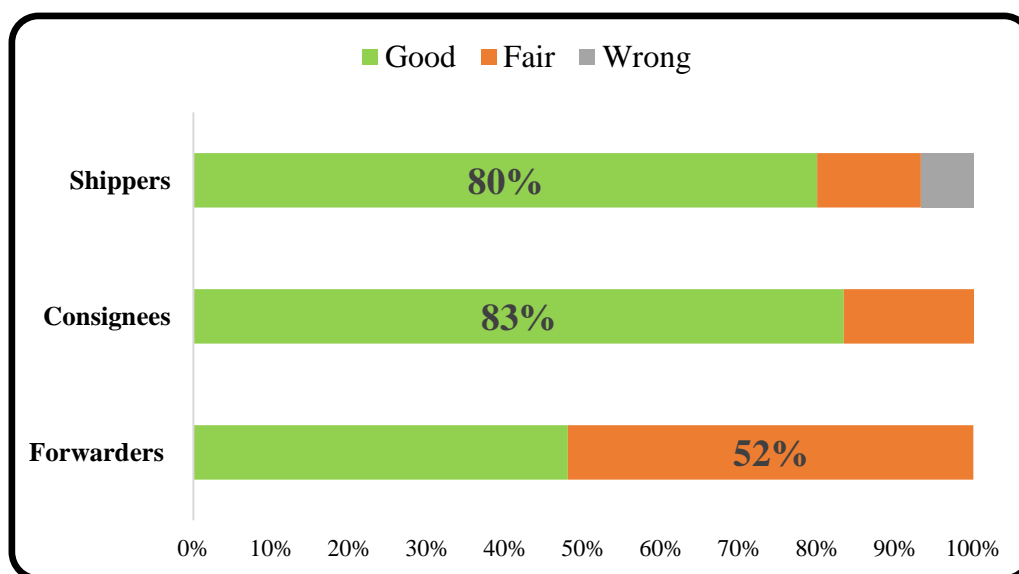


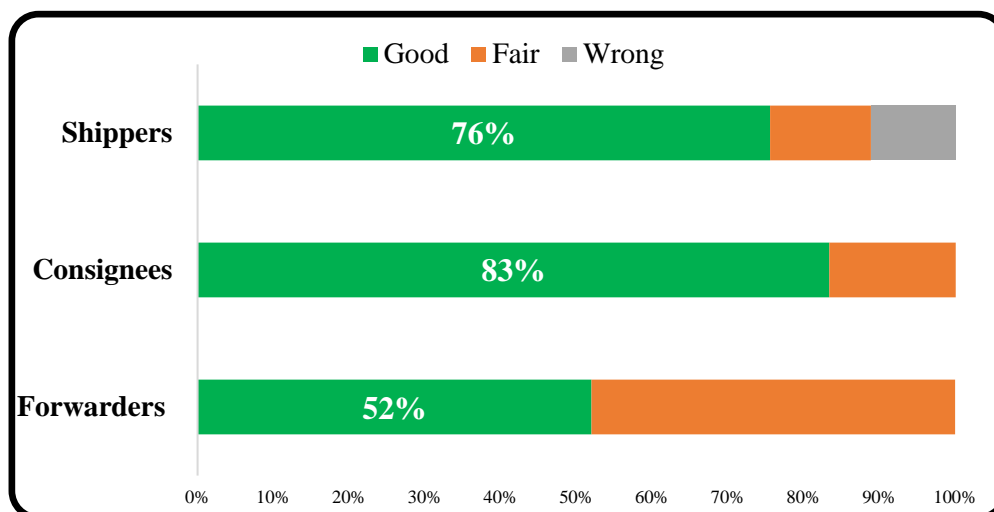
Figure 2: Opinion of key maritime transport players on the quality of port services

Source: Fieldwork, 2020

The analysis of Figure 2 shows that the quality of services offered by the port of Cotonou is considered good by most of the actors interviewed (consignees (83.4%) and shippers (80%)). However, this fair assessment is largely shared by freight forwarders (52%). The performance of the port of Cotonou is judged overall as good rather than fair by the stakeholders.

#### 3.2.1 Benin Single Window, a logistical tool for facilitating foreign trade and the performance of international exchanges

The port of Cotonou is continuing its metamorphosis, offering a better logistical solution for the routing of goods both for the Beninese national territory and for the countries of the hinterland of the WAEMU area. Indeed, according to 70.33% of respondents, the current port logistics tool of the port of Cotonou facilitates trade with the hinterland. Figure 3 shows the assessment of the quality of logistics services in the port of Cotonou over the last five years.



**Figure 3:** Quality of logistics services in the port of Cotonou

**Source:** Fieldwork, October 2020

The analysis of Figure 3 shows that the quality of logistics services in the port of Cotonou is judged to be good by the majority of consignees (83%), shippers (76%) and freight forwarders (52%) and fair (48%) by freight forwarders, consignees (17%) and shippers (14%). Thus, for the past five years, the quality of logistics services in the port of Cotonou has been judged as good by more than 50%.

In fact, the Autonomous Port of Cotonou has set up an operational one-stop port facility that brings the port of Cotonou into line with international standards for the facilitation and securing of international trade. This fully computerised tool was set up on 10 November 2010, in the framework of a public-private partnership between Benin and SEGUB (Benin one-stop-shop port operating company). SEGUB is a mixed economy company whose members are the Beninese state, the company SOGET and the Bureau VERITAS-BIVAC group.

It is a computerised system that interconnects all the entities involved in the Benin port logistics chain (PAC, SEGUB, CNCB, Benin Customs, CCIB, SOBEMAP, Maersk, Grimaldi, SMTC, etc.), constituting a centralised and mutualised database under the impetus of the concession company (SEGUB).

Initiated on 10 November 2010 by the convention signed between Benin and SEGUB, it was on 11 October 2011 that it was officially installed in the port of Cotonou. SEGUB is a computerised one-stop shop system that centralises all transit operations on a slip leading to the removal of goods in a very short time. Similarly, it is now a service offer for both shipowners and shippers, the essential parameters of which are quality and security.

When the Single Invoice Form (BFU) is issued and received by the authorised forwarder, payment is made at any point on Beninese national territory where there is a SEGUB partner bank branch. This system aims to make life easier for commercial actors and to transfer the complexity of the action to the SEGUB platform, whose data will be processed and centralised with the other structures of the place.

With the aim of making the PAC more efficient and captive for user countries, the Single Port Window (SPW) proposes the automation and optimisation of electronic procedures for the

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management of ship traffic, the management of goods and the management of intermodal transport 24/7. Its scope of intervention covers all port activities related to ships and goods, import, export, transshipment, and transit.

The main objectives of SEGUB are defined as follows:

- ✓ Improving the efficiency of the port logistics chain.
- ✓ Reduction of risks and shortening of processing times, by bringing together in one place all the participants in foreign trade.
- ✓ Increased transparency in business-administration relations.
- ✓ Simplification and acceleration of procedures and formalities for the entry or exit of goods, including in transit, i.e., the processing of files is thus privileged, the fluidity of goods is accentuated, and customs clearance accelerated.
- ✓ Cost reduction.
- ✓ Establishment of an environment favourable to the competitiveness of economic operators and the possibility of working in just-in-time.
- ✓ Increase of the administrative competitiveness of Benin (International Trade and Investment Place) in the processing of cross-border trade.
- ✓ Improved visibility for the Authorities: statistics and reports.
- ✓ Bringing landlocked countries closer to their main ports of unloading/transit (reduction of transport time and increase in traffic fluidity).

This modern tool is welcome for operators in hinterland countries, especially those in the Sahel region of the WAEMU community, who send a very large proportion of their imports, including exports, through the port of Cotonou. And who, before, were hurt by the long waiting times (usually more than a month) that they observed in the completion of formalities at the port of Cotonou to get their goods out and to get them to their destination.

So many malfunctions forced them to abandon the port of Cotonou and direct their trade to ports in neighbouring countries (port of Lomé, port of Abidjan, port of Tema, etc.). Saving time is the most important element that economic operators look for in the reception and distribution of their goods.

In addition, despite the efficiency of the management recognised at SEGUB, it is faced with certain difficulties. The computer logistics is not yet up to date, both from the point of view of customs procedures (ASYCUDA), which will disappear in favour of the interface of the Single Port Window. It has not yet succeeded in making the transition properly, which reduces the advantages linked to the automaticity of procedures linked to the establishment of the declaration. In addition, there are difficulties in connecting to the customs server by authorised customs agents to validate their declaration.

The One-Stop-Shop for Ports, which is supposed to simplify formalities and procedures and significantly reduce delays, is only unique in its theoretical geographical configuration. Several obstacles remain: slowness in the establishment and routing of invoices by the various authorities and official structures concerned, poor internet connection, occasional power cuts, lack of control of the operation by users, lack of information and training.

This logistical device facilitates the speed of goods transit operations and stimulates import-export traffic through the Benin corridor.

Thus, this unique platform, dematerialised and interactive, is entirely dedicated to the facilitation of international trade and has the particularity of proposing a service of "securing state revenues" of the port actors of the public sector as well as the parapublic sector of Benin.

### **3.2.2 Port ERP, a performance information system for the Autonomous Port of Cotonou**

The reforms undertaken have contributed to the improvement of the macro-economic framework, the gradual disengagement of the State from the productive sector, the restructuring of the financial sector and the improvement of public finance management. The Autonomous Port of Cotonou is in a direct competitive port environment in the WAEMU sub-region with the ports of Lomé and Abidjan.

Aware of this reality, the PAC is improving the quality of its services offered to the various actors using the port platform; that is to say, beyond the terminals, warehouses or advanced handling equipment and the management of its information flows. Thus, in its quest for new opportunities and its desire to emerge towards sustainable growth and to increase its performance, the PAC has acquired software and hardware packages within the framework of the Integrated Management System of the Autonomous Port of Cotonou (SIGPAC) project, financed by the Millennium Challenge Corporation.

This is an integrated management software package for port operations, known as ERP (Enterprise Resource Planning). A real management tool in line with modern requirements by tracing information flows. Defined as a computerised system for planning and managing company resources. It allows the management of all the operational processes of a company by integrating several management functions, allowing the assembly of all the activities in a process that automates and matches all the transactions associated with it. This port management tool solves the problem of information dispersion and contributes to sustainable development.

The deployment of ERP within PAC allows the Beninese state to secure the port revenues that the national economy needs for the development of the country. The PAC uses ERP Gestion, whose role consists of computerised management of finance and accounting, payroll and human resources, purchasing and stocks. It also uses port business management software, which covers ship calls, cargo, infrastructure, invoicing, port domain, statistics, and management dashboard. In addition, the ERP interfaces with all the other IT systems of the port platform (ASYCUDA, GUP) and allows the port players to be at the same level of information and to be in permanent contact. For example, the ERP software interacts with the ASYCUDA system which handles customs operations. During the exchanges, Customs sends the manifests it receives from the consignees and from the forwarders, the customs declarations.

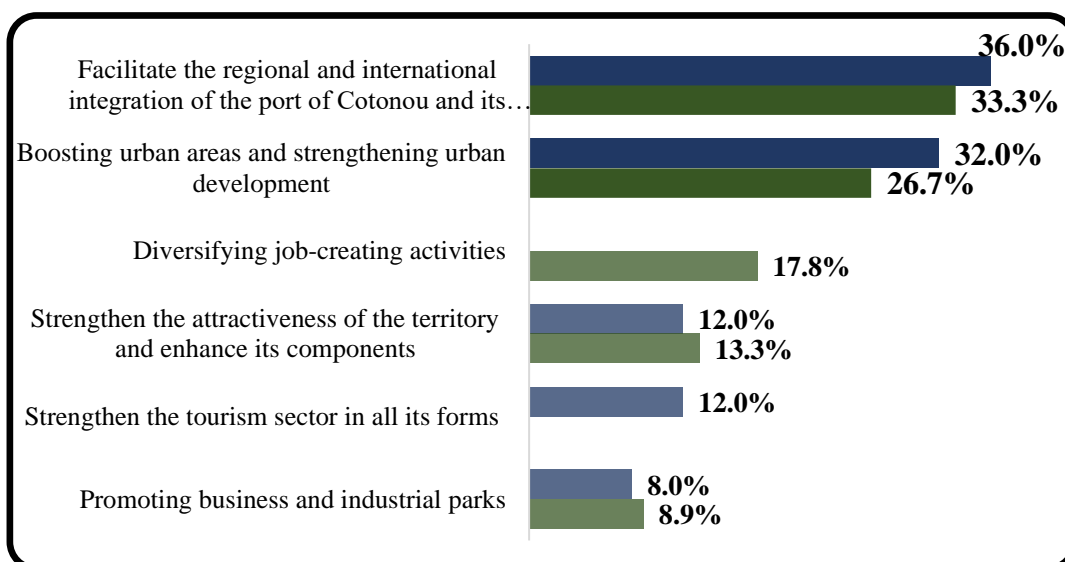
However, the ERP software has shortcomings. This IT tool requires the permanent use of an internet connection. The remoteness of the integrator, the lack of staff training, the poor adaptation of agents to changes, and the incessant interruptions of the Internet network all hinder the smooth running of operations from time to time.

Nevertheless, the ERP is a step forward for the PAC, as it is a tool for strengthening the organisation of the port of Cotonou and contributes to the performance of the PAC. It is true that the implementation of modern port management mechanisms (GUP and ERP) has simplified the process of goods passage in the port of Cotonou. However, the plurality of documents and information in maritime exchanges makes their management more complex.

### 3.3 Economic stakes of the Cotonou port platform in international trade

Since the liberalisation of trade, Benin has recorded significant import and export flows, thus improving its economic situation. Free trade is a commercial economic policy even if it is basically an economic doctrine. It seeks to achieve the free movement of goods and people between countries, through the removal of restrictions on foreign trade. But it never abolishes restrictions, but rather mitigates them through the effect of lowering customs duties and taxes.

However, foreign trade is the strongest link that unites peoples and cultures, in a perspective of sustainable economic development. Therefore, the Cotonou port platform is becoming a cornerstone for international trade and the engine of Benin's economic growth. In this regard, the opinions of freight forwarders and shippers were collected on the economic impact of the port of Cotonou on its hinterland. Figure 4 illustrates the response to this concern.



**Figure 4:** Positive economic impact of the Port of Cotonou on the international hinterland

**Source:** Fieldwork, October 2020

According to the survey statistics, the major economic impact of the port of Cotonou, according to freight forwarders, is on "the ease of regional and international integration of the port (36%)" and "the dynamization of urban areas and the reinforcement of the city's development (32%)". The other secondary impacts concern the strengthening of the tourism sector in all its forms (12%), the strengthening of the attractiveness of the territory (12%) and the promotion of industrial activity zones (8%).

On the other hand, among shippers, "Facilitating the regional and international integration of the port of Cotonou and its hinterland (33.3%)" is in first place, followed by "boosting urban areas and strengthening the development of the city (26.7%)", "diversifying job-creating activities (17.8%)" and "strengthening the attractiveness of the territory and enhancing its components (13.3%)" are the main positive economic impacts of the port of Cotonou on the countries it serves (hinterlands).

While shippers with less than 10 years' experience basically point to the ease of regional integration, those with more than 10 years' experience identify the port as contributing more to the diversification of job-creating activities.

Similarly, several indicators of logistics and operations management in the port sector make it possible to evaluate the efficiency of ports in the WAEMU region. Among others, licensed forwarders, itinerant freight forwarders and shippers have expressed their views on certain indicators on which the choice of a port depends. Our survey revealed that the efficiency of handling (80%) remains the indicator that determines the choice of port. This indicator is unanimously identified by all categories of forwarders operating on the Cotonou port platform.

On the other hand, for shippers, 'Reliability of the transaction cost (37.8%), followed by the efficiency of the container terminal (24.4%) and the facilities offered by the structure of the port of entry (20.0%)' are the main indicators determining the choice of a port for shippers. This is followed by distance and time to deliver goods, good quality of service and handling efficiency.

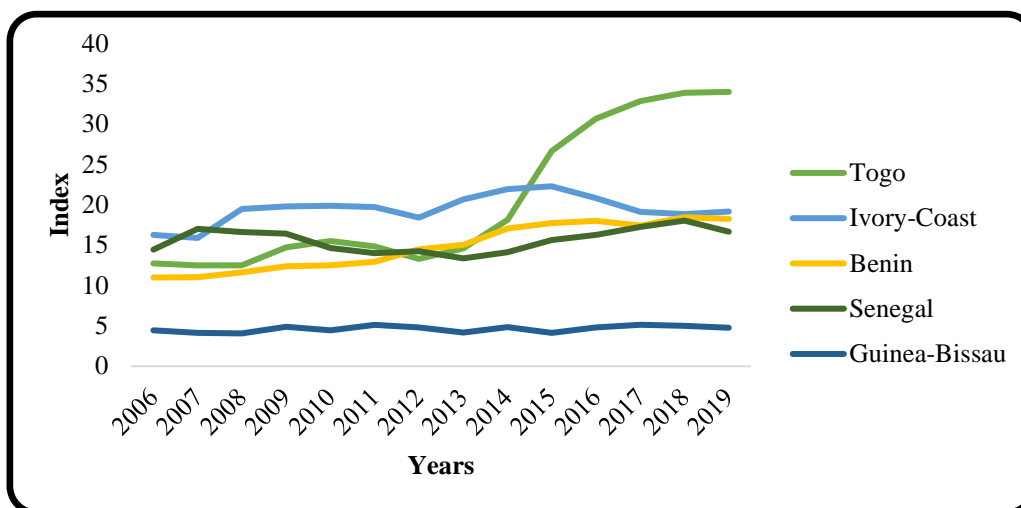
However, the performance indicators of the maritime transport sector allow policy makers, maritime and port authorities to evaluate and monitor the performance of the port of Cotonou and the country's maritime transport companies, in order to provide them with analytical tools to guide the development of policies in the field of maritime transport. These indicators are essential for benchmarking and self-evaluation. Thus, they allow for the assessment of the progress made in achieving the objectives and targets set in the maritime transport and port sectors.

Some performance indicators for maritime transport will be assessed, namely: maritime transport connectivity, port dwell times, port performance.

### **3.3.1 Connectivity of liner shipping**

Liner connectivity is the position of a country or port in the global container shipping network. It is a key factor in global trade accessibility, trade costs and competitiveness. The higher the index of liner shipping connectivity, the easier it is for that country or port to access the global maritime freight transport system, precisely in terms of capacity, transport options and frequency, and thus to participate effectively in international trade.

In addition, the index can be considered both as a measure of maritime transport connectivity and as a measure of competitiveness and trade facilitation. In West Africa, specifically in the UEMOA region, the connectivity index is relatively very low, as the geographical position of the ports does not connect to any major North-South or East-West maritime route. Figure 5 below illustrates the ranking of the connectivity index of scheduled maritime transport for the ports of the WAEMU community.



**Figure 5:** Liner connectivity index for WAEMU ports from 2006 to 2019

**Source:** Vodoungnon Anignikin PADONOU, based on UNCTAD statistics

Figure 5 illustrates the connectivity index of liner shipping for WAEMU ports in West Africa. From 2006 to 2014, Ivory-Coast had the highest scheduled maritime transport connectivity index, during which time the port of Abidjan was the most connected and important gateway for external trade in the WAEMU monetary union. From 2015, Ivory-Coast loses its monopoly position to Togo.

From 2015 to 2019, the port of Lome saw its connectivity index for regular maritime transport rise steadily to 34, snatching first place from the port of Abidjan.

The port of Lomé (Togo) becomes the first breakout port in the economic grouping space. This is followed by the port of Abidjan, the port of Cotonou (Benin), the port of Dakar (Senegal) and, lastly, the port of Bissau (Guinea-Bissau), which is very far from its UEMOA counterparts (practically wiped out).

Thus, Figure 5 shows that the port of Cotonou is in third place from 2014 to 2019. Looking at the figure, we see that the port of Cotonou is in direct competition with the ports of Lome and Abidjan. These ports largely serve the same transit markets in West Africa.

### 3.3.2 Port dwell time

When port dwell time is shorter in a port, it is a positive indicator of port efficiency and commercial competitiveness. Indeed, every hour of sailing time saved in a port allows the different port actors (carriers, shippers, forwarders, consignees, and port authorities) to save money on investments in port infrastructure, warehousing, and storage costs, as well as on equipment expenses for ships.

Since the 2010s, the Beninese government and the port authorities of the port of Cotonou have put in place strategies to reduce downtime in the port of Cotonou in order to welcome more calls and capture more economic operators from its international hinterland.

Ship calls are growing in the five ports of the UEMOA space, during the period 2018 and 2019.

In 2018, the autonomous port of Abidjan recorded 2149 ships, against 2129 for the autonomous port of Dakar, followed by the autonomous port of Lomé, Cotonou, and Bissau. The port of Abidjan received more ship calls than these competitors in the sub-region. However, in 2019 it is the port of

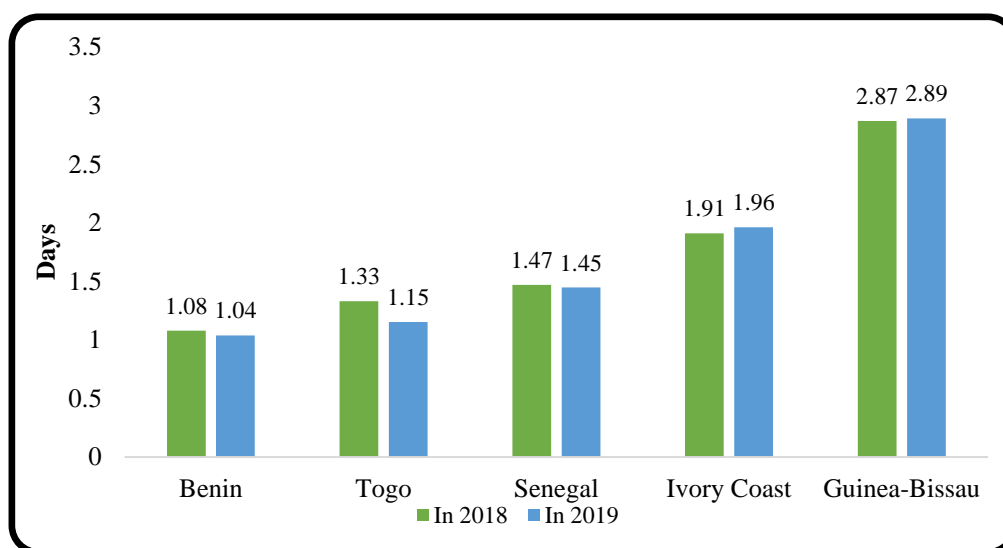
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Dakar that takes the first place from the port of Abidjan with 2461 ship calls against 2254 calls for the port of Abidjan. The other countries, Togo, Benin, and Guinea-Bissau, maintain their position in 3rd, 4th and 5th place respectively, with 1399, 1129 and 146 ship calls.

From 2018 to 2019, there was a steady growth in ship calls on the WAEMU coast. The return to political stability in Ivory-Coast has favoured the rate of frequentation of the port of Abidjan, with an increase of 4.89% in ship calls for the period of 2019. The port of Dakar, the immediate rival of the port of Abidjan, which had hosted the traffic of regular shipping lines in the port of Abidjan during the military-political crisis (19 September 2002 to 4 March 2007) followed by the post-electoral crisis (28 November 2010 to 4 May 2011), recorded an increase of 15.59% in ship calls in 2019. As for the other ports, there was an increase of 7.95%, 7.73% and 44.55% respectively for the ports of Lomé, Cotonou, and Bissau.

The port of Cotonou has seen a slight growth of 7.73% in the number of ships calls for the period 2019. The number of ship calls could improve in the coming years with the ongoing investments in terminal expansion and modernisation of port infrastructure.

In West African ports, long dwell times are observed, mostly due to the inefficiency of these ports in providing an efficient handling service. Indeed, the average dwell time in port for ships is longer for almost all countries and markets, due to outliers. Figure 6 shows the median port dwell time.



**Figure 6:** Dwell times in WAEMU ports in 2018 and 2019

**Source:** Vodounnon Anignikin PADONOU, based on UNCTAD statistics

In all the ports on the coastal coast of UEMOA, there was an improvement in vessel dwell times from 2018 to 2019, except in Côte d'Ivoire and Guinea-Bissau.

From 2018 to 2019, maritime carriers (vessels) spent an average of 1.08 days and 1.04 days at the port of Cotonou, with a celerity rate (-3.70%) in 2019. This performance of the celerity of the port of Cotonou has raised Benin to the first place of the country where ships spend less time in port.

By contrast, in the port of Lome, ships stayed in port for an average of 1.33 days and 1.15 days in 2018 and 2019 respectively. With a speed performance of (-13.53%). The port ranks second in terms of handling speed behind the port of Cotonou, followed by the port of Dakar.

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The detention time at the port of Dakar varies from 1.47 days in 2018 and 1.45 days in 2019 per ship call. This performance for the treatment of ships docking at the port of Dakar, took third place ahead of the port of Abidjan and the port of Bissau. On the other hand, the detention time in port for the countries of Ivory-Coast and Guinea-Bissau is longer than in the other ports of the WAEMU region. Table 2 presents some categories of vessel with their detention time in port.

**Table 2:** Median detention time in UEMOA ports

Countries	All ships	Liquid bulk carriers	Liquefied petroleum gas carriers	Dry bulk carriers	Conventional cargo ships	Container ship
Benin	1.04	1.45	0.90	7.33	0.96	0.85
Togo	1.15	1.65	1.33	3.31	1.78	1.01
Senegal	1.45	2.9	2.00	5.07	1.58	0.67
Ivory-Coast	1.96	2.17	3.14	4.95	2.66	1.14
Guinea-Bissau	2.89	–	–	–	2.68	3.21

**Source:** Vodoungnon Anignikin PADONOU, based on UNCTAD statistics

Table 2 shows the median detention time in port in the UEMOA region for the different categories of ships in 2019. Looking at the different categories of ships, container ships have the lowest median time in port with 1.38 days. These figures range from 0.67 days in Senegal to 3.21 days in Guinea-Bissau.

The port of Cotonou ranks first with the lowest median port detention time for: liquefied petroleum gas carriers (0.90 days), general cargo ships (0.96 days), and bulk liquid carriers (1.45 days). It ranks second for container ships with 0.85 days against 0.67 days for the port of Dakar. Thus, it can be said that the short stay of ships in the port of Cotonou is due to fast and efficient handling operations.

Indeed, in Benin the short stay of ships in port is the result of low frequency, no waiting time or congestion (i.e., no congestion) and low volumes loaded or unloaded at each port of call compared to Ivory-Coast and Senegal.

#### 3.4 Role of port authorities in ensuring access to the international port hinterland of the Port of Cotonou

The role of a port for the economies of 'developing' countries, particularly those in Africa, is essential, as the port is outward-looking and facilitates international trade. The existence of a commercial seaport in Benin considerably influences the commercial activities of the country and its international hinterland.

Thus, the role of the port authorities is important in terms of access to the hinterland. They contribute to the improvement of coordination in the port region (Cotonou port area and its suburbs) and in the international transport chains. In fact, the port region of the port of Cotonou is made up of all the economic activities related to the arrival of ships and cargoes (logistics service providers, freight forwarders, transport companies, handling companies, etc.). Various actors in the

maritime chain were questioned on the influence of the port of Cotonou on its hinterland (the Sahel countries of the WAEMU).

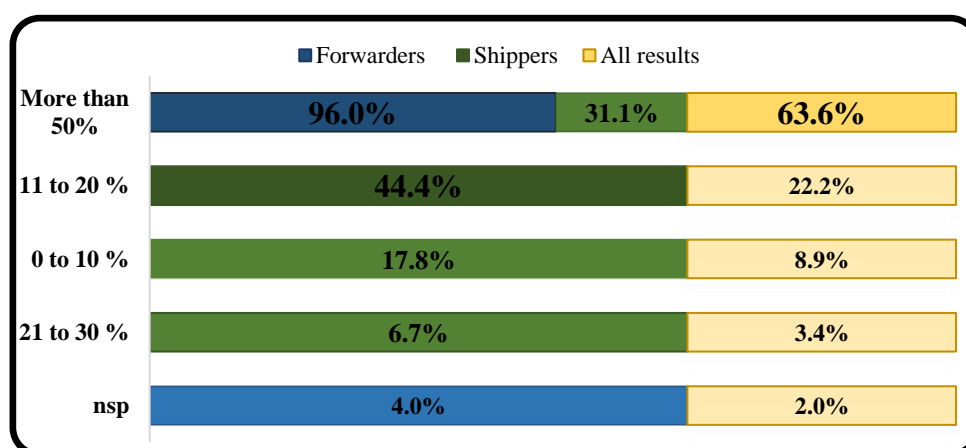
### 3.4.1 Influence of the Port of Cotonou on its hinterland

Stakeholders such as consignees and shippers expressed 100% agreement on the positive influence of the port of Cotonou on its national and international hinterland. However, the freight forwarders surveyed had a mixed opinion.

According to the freight forwarders, the port of Cotonou has a positive influence on its hinterland. This opinion was widely shared by 80% of the freight forwarders and disapproved of by 20%.

Fieldwork has shown that in most transport chains, maritime transport costs are lower than hinterland transport costs. Indeed, the cost of maritime transport in the routing of goods to the port of Cotonou represents a minimal share for consignees compared to other actors (shippers and forwarders). Fifty percent of the consignees surveyed stated that the cost of maritime transport was in the range of 0 to 10% of the overall cost, while 33.3% stated that the cost was between 11 and 20%. For a significant proportion (16.7%) of the consignees, the cost would be between 21% and 30% of the overall amount.

However, Figure 7 shows the share of transport costs in the movement of goods to and from the Sahel countries, as far as shippers and forwarders are concerned



**Figure 7:** Share of transport costs in the movement of goods to and from Sahelian countries

**Source:** Fieldwork, October 2020

The results indicate that 63.6% of the actors surveyed stated that the share of transport costs in the delivery of goods to or from the countries represents more than 50%. For 22.2% of these actors, it represents an order of 11-20%, followed by 8.9% for 0-10%, 3.4% for 21-30% and 2% of respondents who could not comment.

In fact, among the 63.6% of these actors, 96% of the freight forwarders surveyed were of the opinion that transport costs accounted for more than 50%, compared to 31.1% for shippers. On the other hand, for the largest number of shippers (44.4%), the share of transport costs in the routing of goods is between 11% and 20%. It represents less than 10% according to the opinion of 17.8% of shippers.

In fact, most ports in the UEMOA region serve 'questionable' hinterlands (Burkina Faso, Mali, and Niger) and are therefore highly dependent on the quality of port services and transport services to

the hinterland. In our case study, the 'contestable' hinterland is a country or region in which no particular WAEMU port has a cost monopoly and where, as a result, various WAEMU ports have a market share. Some key players in the maritime chain commented on the pace of handling in Benin.

The rate of handling at the port of Cotonou is judged to have improved (96%) by all categories of forwarders, and particularly by the authorised ones (100%). Similarly, according to the opinion of shippers, the rate of handling is good (71.1%) against 24.4% judged to be deteriorating and 4.4% judged to be stable. On the other hand, the rate of handling in the port of Cotonou is judged more degraded (50 %) than stable (16.7 %) or improved (16.7 %) by the consignees.

### 3.4.2 Niger, the leading country in the international hinterland of the port of Cotonou

Traffic generated by landlocked countries using the Benin transit corridor is largely dominated by imports from the international hinterland (Asia, Europe, and America). Niger is the privileged client (among the landlocked countries) of the port of Cotonou, as according to the statistical analysis of international trade it is the main user country of the port. It is a country that imports almost the majority of its consumer goods, equipment and maintenance indispensable to the satisfaction of the needs of the Nigerien population. Figure 8 gives an idea of the distribution of Niger's direct transit through the various WAEMU ports.

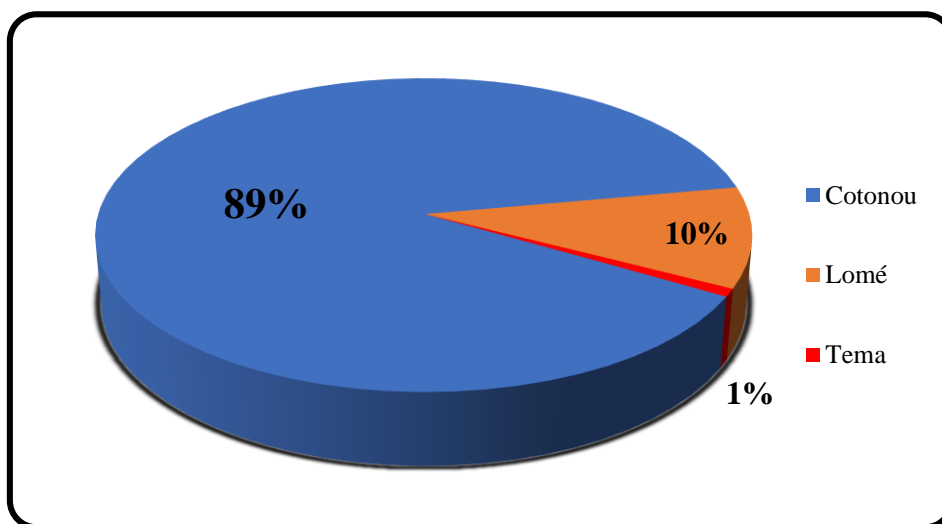


Figure 8: Share of Niger transit traffic in competing ports in 2019

Source: Vodoungnon Anignikin PADONOU, CNUT statistical service, 2019

We can see that in 2019, the port of Cotonou and the port of Lomé account for most of the transit traffic generated by Niger. The large volume of goods transiting through the port of Cotonou confirms once again its vocation as a natural outlet for Niger, with more than 80% of Niger's transit traffic being unloaded there.

In addition, the share of traffic of the port of Lomé in the service of Niger has been considerably reduced compared to previous years when it oscillated around 22% on average.

## 4- DISCUSSIONS

The present research, by examining the role of the port of Cotonou in serving landlocked countries, aims to fill a gap in terms of information on transit traffic, port and maritime activities, as well as

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international trade carried out on the Cotonou port platform. Despite the difficult competitive environment of the companies, the non-accessibility of certain port authorities and the mistrust of the latter, as well as the Covid 19 pandemic, the obstacles were overcome to achieve the objective set for this research.

To return to the results obtained from this field survey, they are relatively close to the achievements of previous research carried out on the issue in the port and maritime domains of Northern countries (Europe, America, and Asia).

On the other hand, almost all international trade in the Republic of Benin is carried out by sea, more than 90% of it. In fact, the port and maritime sector plays an important role in the national economy and in the socio-economic life of the Beninese population. The port of Cotonou is becoming an inseparable link in Benin's port and maritime sector and the cornerstone for more than 80% of tax revenues, and a lever for sustainable development, where administrative and financial formalities were highly corruptible and constraining. Port and financial administrative formalities (PAC, CNCB, Customs, etc.) were burdensome and port actors, especially those in the international hinterland of the port of Cotonou, fled to neighbouring ports.

This perception is corroborated by the authors' research (Myriam Donsimoni, 2015, p. 92; CNUCED, 2015, p. 88; CNUCED, 2010, p. 18). Indeed, they argue that ports are the local economic engines in terms of port and maritime related activities, but also in terms of the industrial activities they generate.

Several researches have shown that the control of information flows through Information and Communication Technologies (ICT) and the flow of port and maritime traffic is a key factor for the development of port and maritime traffic, and favours investments by foreign economic operators in port and logistics development and expansion policies (Léandre N'Djambou et al., 2020, p. 40; Clément Godonou, 2020, p. 73; Cherfaoui Najib, 2015, p. 37). The work of these authors shows that the improvement of port activities depends on the use of ICT. The more the port modernises, by enhancing the development of ICT services, the more the port economy develops, and the port becomes more dynamic in its port and maritime offers.

However, the geographical position of the port of Cotonou constitutes a natural favourable asset for the various international trade exchanges that transit through its port (Messan Lihoussou, 2014, p. 150; Abdou Bontianti et al., 2008, p. 186). The country's political and socio-economic stability is a factor in the growth of port and maritime activity flows (Vodoungnon Padonou, 2019, p. 2067). Thus, some researchers have confirmed that the geographical position of a port on the link/junction between a maritime foreland and a terrestrial hinterland favours commercial exchanges (Clément Godonou, 2018, p. 192; Marie Metge and César Ducruet, 2017, p. 32).

Despite everything, the port of Cotonou must rely on trade (exports and imports) from its international hinterland (Niger, Burkina-Faso, and Mali), from which it must draw much of the transit traffic flow. Thus, the port authorities of Cotonou must build loyalty and provide quality services to reassure the Sahelian countries of the WAEMU without a maritime frontage, as the international hinterland of the port of Cotonou is in strong competition with the ports of West Africa (Lomé, Lagos port complex, Abidjan, Tema, etc.).

#### Conclusion

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The port of Cotonou is the expression of international trade links between the major commercial maritime routes of its international foreland and the economic activities in its national and international hinterland. The port of Cotonou thus becomes an indispensable platform characterised by the commercial exchange relations of the traffic of products to and/or from the countries of the hinterland, and vice versa for the international foreland.

In fact, the choice of a port nowadays is becoming more and more a strategic and economic issue for the Sahel countries of the WAEMU area. For port and maritime economic operators, port traffic, port logistics services, the rate at which goods are processed and the mastery of ICTs partly determine the assets that a port must have in serving its hinterland. Nowadays, the hinterland of the WAEMU area is increasingly at stake in economic competition for all the ports of this economic community, each of which is seeking to take market shares in a competitive and monopolistic perspective.

Indeed, the maritime traffic of the port of Cotonou has grown rapidly for all types of cargo but faces great challenges due to the lack of efficient land links with the hinterland. Indeed, the port of Cotonou is the most secure and least rugged ocean gateway to serve the 65 million inhabitants of Mali, Burkina-Faso and Niger, the leading transshipment port to Nigeria, with its 206 million consumers (Worldometer, 2020).

The port of Cotonou, a true transit port and the first transit port of Niger, has been investing for a decade in reforms and extension and modernisation projects to withstand competition from the ports of the West African Coast (WAC), in particular its immediate neighbours, the port of Lomé and the port complex of Lagos. However, the port of Cotonou has the assets to compete with the ports of the West African row, particularly those of the WAEMU, with an extensive hinterland and significant volumes. Similarly, its geographical position is strategic, and it constitutes a back-up port for the Federal Republic of Nigeria.

Therefore, no port, in particular the port of Cotonou, can develop without good commercial relations with the international hinterland through the factors of exchange and distribution that are the traffic of goods (exports and imports), the port and maritime infrastructures, and the transit corridors.

#### Bibliography

**ABBES Souhir ET GUILLAUME Jacques (2008)** : Ports de commerce et économie portuaire, MARE ECONOMICUM : Enjeux et avenir de la France maritime et littorale, *Presses universitaires de Rennes, Économie, gestion et société*, Rennes, pp. 361-389

AGBANDJEDJE Marc Sènoudé (2015) : Le port de Cotonou et son arrière-pays, Thèse de doctorat en Géographie, Université d'Abomey-Calavi, 248 p.

**ALLAGBE, Sotondji, Benjamin (2014)** : *Activités de transit et transport international au nord-est du Bénin*. Thèse de doctorat en Géographie des transports, Université de Lomé, 368 p.

**ALLAGBE, Sotondji, Benjamin et NDJAMBOU, Léandre Edgard (2018)** : Puissance publique et développement portuaire le cas de Cotonou (Bénin), *Moderniser les Ports Ouest-Africains : Enjeux et perspectives, Collection Afrique Atlantique, EMS*, pp. 101-122

**BONTIANTI Abdou et YONLIHINZA, Issa Abdou (2008)** : « La RN 6 : un exemple d'intégration économique sous-régionale et un facteur de désenclavement du Niger », *Les Cahiers d'Outre-Mer*, pp. 241-242

### HAGIA SOPHIA 3. INTERNATIONAL CONFERENCE ON MULTIDISCIPLINARY SCIENTIFIC STUDIES

**CHARLIER, Jacques et TOSSA, Jean (1996)** : L'arrière-pays international du port de Cotonou ». *Bulletin de la Société Belge d'Etudes Géographiques*, vol. 65, n°1, pp. 93-122.

**CNUCED (2015)** : Etude Diagnostique sur l'Intégration du Commerce au Niger (E.D.I.C). UNCTAD/ALDC/INF/6, New York et Genève : Secretariat de la CNUCED, 180 pages

**CNUCED (2010)** : Guide de l'investissement au Bénin. Opportunités et conditions. New York et Genève : Secretariat de la CNUCED, 58 pages.

**CNUCED (2003)** : *Réforme et place du secteur privé dans les ports africains, Rapport de la Conférence des Nations Unies sur le Commerce et le Développement (CNUCED)*, UNCTAD/SDTE/TLB/5, 31 mars 31 pages

**DONSIMONI, Myriam (2015)** : Symbioses Port-Ville pour un meilleur ancrage local des activités industrialo-portuaires : l'exemple de Safi au Maroc. *ÉCONOMIE CIRCULAIRE ET ÉCOSYSTÈMES PORTUAIRES, Circular economy and port ecosystems*, EMS, pp. 91-105

**GODONOU, Clément., Jijoho (2020)** : Les TIC et la facilitation des opérations au port de Cotonou (Bénin). *GOUVERNER PORTS, TRANSPORTS ET LOGISTIQUE À L'ÈRE DU NUMÉRIQUE, Collection Afrique Atlantique*, EMS, pp. 67-88

**GODONOU, Clément., Jijoho (2018)** : Importance stratégique du trafic roulier dans la compétitivité du port de Cotonou. Moderniser les ports Ouest-africains : Enjeux et perspectives, *Collection Afrique Atlantique*, EMS, pp. 187-204

**JANIN, Bernard (1964)** : le nouveau port de Cotonou, *In Revue de géographie alpine*, tome 52, n° 4, 1964, pp 701-712

**LIHOUSSOU, Messan (2014)** : *Ports et désenclavement territorial : cas de l'arrière-pays du port de Cotonou*. Thèse de doctorat en Géographie des transports, Université de Havre, 465 p.

**METGE, Marie et DUCRUET, César (2017)** : L'Afrique dans la logistique mondiale : une approche par les réseaux d'armateurs de lignes maritimes conteneurisées. *Les Cahiers scientifiques du transport*, AFITL, pp.17-41

**NAJIB, Cherfaoui (2015)** : « Le conteneur et le transport maritime, lignes d'horizons », *Les Afriques*, n° 336, novembre, pp. 36-37

**NDJAMBOU, Léandre Egdard., MAKANGA BALA, Martial Pépin., et ZOMO BITEGUE, Léon Gontrand (2020)** : Les TIC dans la modernisation et la sécurisation du port d'Owendo au Gabon. *GOUVERNER PORTS, TRANSPORTS ET LOGISTIQUE À L'ÈRE DU NUMÉRIQUE, Collection Afrique Atlantique*, EMS, pp. 38-66

**N'BESSA, Benoît (1997)** : *Porto-Novo et Cotonou (Bénin) : origine et évolution d'un doublet urbain*. Thèse de doctorat d'Etat, Paris, Université Michel de Montaigne-Bordeaux III, 1997, p. 424 pages

**PADONOU, Vodoungnon., Anignikin; BIAOU OLAYE Afolabi Romaric., Igor et ALLAGBE, Sotondji., Benjamin (2019)**: Analysis of the Competitiveness Factors of the Port of Cotonou in the Economic Growth of Benin, *International Journal of Management and Economics Invention*, vol. 05, pp. 2064-2069.